Geo_13 – Moving In and Mōving Up

1 Subject Area

Geography

2 Suggested Level

Years 9–10

3 Key Statistical Literacy Competencies

- Data awareness
- The ability to understand statistical concepts
- The ability to analyse and interpret and evaluate statistical information
- Communicating statistical information and understandings

4 Overview

This classroom activity explores the rapid changes occurring in the inner part of Australia's capital cities. It provides a useful introduction to city programs which are being undertaken by some schools. The changes noted are similar to those taking place globally. Rising fuel prices, concerns about global warming and sustainability, increasing numbers of single people and changing lifestyles contribute to the growing number of people seeking an inner city lifestyle. In Australia, the mid part of the twentieth century saw an outward drift in cities, where new suburbs were developed in response to growing car use. However, the first part of the twenty-first century has been characterised by inner city growth. The high value of urban space in the inner city has given rise to growth in apartment dwelling and as a result an increase in population density.

The activity uses Statistical Local Areas (SLAs) to define the central area of Australia's capital cities. The SLA is closely aligned with the Postal Areas of the central part of the capital cities. QuickStats and Time Series Community profiles from the Census of Population and Housing have been used, as well as related ABS publications.

Data is provided for every capital city in Australia. It is envisaged that for most activities, teachers will choose the capital city appropriate for their state.

5 Requirements

- Spreadsheet software program(optional)
- Map of the central area of chosen city
- Geo_12 worksheet (template or interactive population pyramid)

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6 Instructions

Background

What is the population?

The official population count for Australia is the **Estimated Resident Population (ERP**), which is published quarterly in Australian Demographic Statistics (cat. no. 3101.0), Births, deaths and migration statistics are used to determine the Estimated Resident Population. The Census of Population and Housing is conducted every five years and provides a detailed snapshot of Australia's population at that moment in time. It also serves as a benchmark for population estimates.

Changes to the Method of Collection

Census data may be returned in two ways, namely **Place of Usual Residence** and **Place of Enumeration**. Prior to 2006, a person was counted according to their location on Census night (Place of Enumeration). However, from 2006 onwards, data are primarily shown according to where they usually live (Place of Usual Residence).

Care should be exercised when making comparisons of Census data over time and the method of data collection should be clarified.

Geographic Units

In the Census, the smallest geographic area is a Collection District. It consists of approximately 225 households and generally represents the work of one Census collector. Collection Districts are aggregated to form larger geographic areas as part of the Australian Standard Geographic Classification (ASGC), (cat. no. 1216.0). **A Statistical Local Area (SLA)** is one of these larger geographic units and for this activity is the most appropriate way of representing the inner city area of Australia's capital cities.

6.1 Where is the inner city?

Ask students to complete the following activities for a city of their choice.

1. Provide a map of the central area of the chosen city. Ask students to use the Australian Bureau of Statistics website for Census information www.abs.gov.au/census. Select 'Census Data Online' and the product 2006QuickStats. Use the 'Search' tab to locate the area of study. For all capital cities (except Brisbane, Canberra and Darwin) type in the name of the capital city and press 'Search'. Select 'Statistical Local Areas' shown in Table 1. A new map is generated showing the boundaries of this area. To view statistics on the area click 'View QuickStats'

   To find the Statistical Local Area for inner Brisbane, Canberra and Darwin use the 'Browse' tab and search for the location 'Statistical Local Area'. Brisbane

is found within the Inner Brisbane Statistical Subdivision, Canberra within the North Canberra Statistical Subdivision and Darwin within the Darwin City Statistical Subdivision.

Ask students to shade their own map to show the boundaries of the Statistical Local Area covering the centre of the chosen capital city.

2. Identify the boundaries which form the northern, eastern, southern and western sides of the Statistical Local Area.

   Does this area conform to your idea of the central part of the capital city? Discuss.

6.2

6.3 How many people live in the centre of our capital cities?

Activities in Section 6.2 should be completed in conjunction with the background information provided at the beginning of this section.

The Census of Population and Housing provides a snapshot of the population at a point in time. The Census is held in August during the school term.

TABLE 1: COMPARISON OF CENSUS POPULATION COUNTS FOR INNER CITY SLA, PLACE OF ENUMERATION AND PLACE OF USUAL RESIDENCE, 2006

Comparison of Populations	**Census Community Profile Series (Time Series)**	**QuickStats**
SLA codes and names	**Located on census night (Place of enumeration)**	**Place of usual residence on Census night**
105057201 Sydney (C) - Inner	36083	21991
205054601 Melbourne (C) - Inner	22283	11590
305011143 Brisbane City - Inner	6229	2716
405150070 Adelaide (C)	22770	16659
505057081 Perth (C) - Inner	4892	1079
605052811 Hobart (C) - Inner	1050	456
705051018 Darwin City - Inner	6239	2484
805051449 Canberra City	1822	723

Source: 2006 Census of Population and Housing, Census Community Profile Series(Time Series) and QuickStats

Study Table 1 and for a chosen city answer the following questions:

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1. Does the number of persons usually resident in the inner city outnumber the persons enumerated?

2. For the chosen city, calculate the difference between the two count methods. Account for the difference in populations recorded.

The **Estimated Resident Population (ERP),** which is based on the Census Place of Usual Residence count adjusted for births, deaths and migration is the official population count. Estimates are made annually for Statistical Local areas and they are published in Regional Population Growth (cat. no. 3218.0), see Table 2.

3. Using the official population count, the ERP (Table 2), rank Australia's capital cities according to the population of the innermost Statistical Local Areas in 2007. Is the ranking one that was expected?

TABLE 2: ESTIMATED RESIDENT POPULATION AT 30 JUNE, 2010 FOR SELECTED SLA, AUSTRALIAN CAPITAL CITIES

SLA	Area km²	Population 2010(p)	Population density 2010 (persons /km²)
Sydney (C)- Inner	4.2	25677	6107.1
Melbourne (C) - Inner	1.9	15427	8040.1
Brisbane City - Inner	0.7	3549	5040.4
Adelaide (C)	15.6	19876	1276.3
Perth (C) - Inner	1.8	1834	1007.3
Hobart (C) - Inner	1.2	978	785.4
Darwin City - Inner	2.6	4120	1338.6
ACT Canberra - City	1.5	1293	885.3

(p) estimates for 2010 are preliminary
Source: Regional Population Growth (cat. no. 3218.0)

4. Are there persons in the inner city who may not have been counted on Census night?(answer provided)

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6.4 Have the inner parts of our capital cities changed over time?

1. For a city of your choice and using Table 3, make a graph to show the growth in the number of people resident in the inner city between 1996 and 2006. (answer provided)

The average annual growth rate is calculated as a percentage using the formula below, where P_0 is the population at the start of the period, P_n is the population at the end of the period and n is the length of the period between P_n and P_0 in years.

$$\left[\left(\frac{P_n}{P_0}\right)^{\frac{1}{n}} - 1\right] \times 100$$

2. Use the average annual growth rates provided in Table 3 to compare growth of your chosen city with that of other Australian cities in the period 1996-2006.

3. In groups, ask students to discuss the changes taking place in the city to accommodate a growing population.

TABLE 3: POPULATION ESTIMATES BY STATISTICAL LOCAL AREA, 1996 - 2006

Statistical Local Area	1996	2001	2006	1996-2001	2001-2006	2005-2010
	no.	no.	no.	Average Annual Growth Rate (%)	Average Annual Growth Rate (%)	Average Annual Growth Rate (%)
Sydney (C) - Inner	6233	14618	22733	18.6	9.2	3.3
Melbourne (C) - Inner	1774	6498	12431	29.6	13.9	6.1
City - Inner Brisbane	345	1021	2823	24.2	22.6	6.4
Adelaide (C)	12831	13289	17632	0.7	5.8	3.5
Perth (C) - Inner	420	777	1227	13.1	9.6	12.1
Hobart (C) - Inner	378	439	488	3.0	2.1	1.3
Darwin City - Inner	1823	2112	2820	3.0	6.0	9.3
ACT Canberra - City	174	484	720	22.7	8.3	12.9

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Source: Regional Population Growth, Australia (cat. no. 3218.0)

6.5 What is the population density of our inner cities?

1. Use Table 2, Estimated Resident Population at 30 June 2007, to identify the population density of your chosen city.
2. How is population density calculated?
3. How would population density change during a 24 hour period in the inner city areas?
4. Ask students to research how the population density of Australian inner city areas compares with the world's major cities. Whilst completing this task ask the questions

    (1) What is the source of the data?

    (2) How was the data collected?

6.6 What are the characteristics of dwelling units in the inner city?

There has been a significant increase in apartment living in the inner cities due to population growth, changes in the composition of households, lifestyle choices and the high value of land. The Census of Population and Housing gathers data about dwelling types. A number of activities are provided below. Choose one or more activities to suit the student group.

1. For the city of your choice, use Table 4 and create a graph to show the change in the number of flats, units or apartments between1996 – 2006.
2. Calculate the percentage increase in flats, units or apartments for the ten years from 1996 – 2006 for your chosen city.(answer provided)
3. For the city of your choice and with reference to the statistics calculated above and provided in Table 4, briefly describe the changes which have taken place in this type of private dwelling between 1996 and 2006 and provide reasons for the change identified.
4. Locate an image of a high rise apartment block (Google Maps satellite/Streetview may be helpful) and ask students to annotate it to show the advantages and disadvantages of living in this type of accommodation.

TABLE 4: SELECTED DWELLING CHARACTERISTICS FOR SELECTED SLA's OF AUSTRALIAN CAPITAL CITIES, 2001 and 2006				
Statistical Local Area	**No. Occupied Private Dwellings: Flat, unit or apartment**	**No. Occupied Private Dwellings: Flat, unit or apartment**	**No. Occupied Private Dwellings: Flat, unit or apartment**	**Flats, units or apartments as % of Total Occupied Private Dwellings in**

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	1996	2001	2006	Region 2006
Sydney (C) - Inner	2141	6242	8667	88.8%
Melbourne (C) - Inner	764	3991	6621	98.2%
Brisbane City - Inner	101	518	1844	96.5%
Adelaide (C)	1922	2392	3252	41.5%
Perth (C) - Inner	106	178	538	78.5%
Hobart (C) - Inner	22	26	24	20.0%
Darwin City - Inner	361	1271	1068	91.0%
ACT Canberra - City	59	242	419	92.5%

Source: 2006 Census of Population and Housing, Census Community Profiles(Time Series), QuickStats.

5. Debate the topic:

   "Apartment living is the only sustainable way for Australians to live."

6. Imagine that a two storey heritage precinct in the inner part of your chosen capital city is to be redeveloped into a 40 storey office and residential tower.

   6.1 Create a role play to simulate the arguments which will be advanced by different members of the community to this proposal. Roles may include: A local council representative, a council officer responsible for granting the planning permission, a resident adjacent to the development who will be overlooked by the tower, a young person seeking accommodation in the city, an elderly citizen, a public transport activist, a local retailer, an environmentalist, an architect, a service provider (e.g. water, gas or electricity) and a historian.

   6.2 The building is to be designed with 'green' credentials. Research methods of construction that are being implemented to make high rise city developments more environmentally sustainable.

7. Imagine the year is 2040 and there is a great deal of urban renewal taking place in the centre of your chosen city. The office and apartment blocks built at the end of the last century and the start of this century are being replaced by much higher towers. Following a visit (either real or virtual) to the inner city area to study the nature and distribution of the high rise towers, identify the towers that you would recommend for heritage status as classic examples of late twentieth century architecture. These towers will become heritage buildings and will therefore be protected against future urban renewal. With the aid of annotated photographs illustrate why the chosen high rise building should be preserved.

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6.7 Who lives in the inner city?

1. The **Estimated Resident Population (ERP)** provides the most accurate count of the population. Use the statistics provided in Table 5A-C and the template or interactive age sex pyramid provided, to create an age sex pyramid for the capital city of choice. The age sex pyramids are provided for comparison in the answer section of this activity.

2. Describe the pyramid by choosing the correct words in the spaces below.

   The age sex pyramid presents males to the **right/left** and females to the **left/right**. The base of the pyramid is **wider/narrower** than the middle section and there were approximately .....children aged less than 15 years old. The top of the pyramid is **wide/narrow**, with approximately .....people over the age of 75 years. The sides of the pyramid representing the ages above 15 years are **concave/ convex** and the most prominent bulge occurs at .....years. There are approximately ..... people in this age category. The sides of the pyramid above 15 years of age slope **evenly/unevenly**. Males and females occur in **similar/very different** numbers throughout the age groups although there are more males than females in the following age groups ..... and more females than males in these age groups.....

3. Explain the shape of the pyramid by answering the following questions;

   a) Why is the base narrow?

   b) Why is the top narrow?

   c) What reasons explain the large bulge in numbers?

   d) What reasons explain variations between the sexes in the different age groups?

4. Ask students to brainstorm the advantages and the disadvantages of living in the inner city for people of different age groups e.g. very young children, young adults, working population and the elderly. In addition, discuss if they would like to live there?

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TABLE 5A: ESTIMATED RESIDENT POPULATION BY AGE AND SEX, SELECTED SLA'S JUNE 30, 2010									
	SYDNEY(C) INNER			MELBOURNE(C) INNER			BRISBANE INNER		
Age (years):	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
0-4 years	297	255	552	152	115	267	44	49	93
5-9 years	178	200	378	39	43	82	26	15	41
10-14 years	216	175	391	58	33	91	12	28	40
15-19 years	650	670	1320	488	516	1004	72	53	125
20-24 years	2282	2582	4864	2392	2559	4951	323	278	601
25-29 years	2124	2078	4202	1925	1882	3807	398	270	668
30-34 years	1238	1112	2350	885	649	1534	216	134	350
35-39 years	781	597	1378	452	355	807	165	95	260
40-44 years	744	545	1289	331	221	552	152	63	215
45-49 years	629	454	1083	289	234	523	79	93	172
50-54 years	555	495	1050	224	201	425	96	98	194
55-59 years	539	414	953	222	240	462	147	60	207
60-64 years	358	284	642	200	135	335	141	97	238
65-69 years	259	212	471	131	89	220	101	66	167
70-74 years	209	138	347	65	81	146	73	31	104
75-79 years	135	121	256	41	36	77	6	23	29
80-84 years	92	98	190	34	45	79	6	18	24
85 years and over	52	73	125	36	29	65	11	10	21
Total	**11338**	**10503**	**21841**	**7964**	**7463**	**15427**	**2068**	**1481**	**3549**

Source: Population by Age and Sex, Regions of Australia, 2010 (cat.no 3235.0)

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TABLE 5B: ESTIMATED RESIDENT POPULATION BY AGE AND SEX, SELECTED SLA'S JUNE 30, 2010									
	ADELAIDE (C)			PERTH (C) INNER			HOBART (C) INNER		
Age (years):	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
0-4 years	203	186	389	12	12	24	23	19	42
5-9 years	138	131	269	4	4	8	18	15	33
10-14 years	151	136	287	7	8	15	8	13	21
15-19 years	563	627	1190	28	25	53	24	27	51
20-24 years	1614	1643	3257	76	78	154	82	60	142
25-29 years	1238	899	2137	91	52	143	92	62	154
30-34 years	883	682	1565	75	49	124	57	31	88
35-39 years	663	424	1087	79	33	112	42	32	74
40-44 years	578	407	985	68	33	101	36	23	59
45-49 years	506	423	929	53	24	77	39	18	57
50-54 years	501	449	950	36	17	53	35	22	57
55-59 years	572	487	1059	41	29	70	34	35	69
60-64 years	390	313	703	22	11	33	22	15	37
65-69 years	263	259	522	23	9	32	15	10	25
70-74 years	167	198	365	10	3	13	15	12	27
75-79 years	181	193	374	9	9	18	10	7	17
80-84 years	132	186	318	5	3	8	10	7	17
85 years and over	89	236	325	0	0	0	5	3	8
Total	**8832**	**7879**	**16711**	**639**	**399**	**1362**	**567**	**411**	**978**

Source: Population by Age and Sex, Regions of Australia, 2010 (cat.no 3235.0)

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TABLE 5C: ESTIMATED RESIDENT POPULATION BY AGE AND SEX, SELECTED SLA's JUNE 30, 2010						
	DARWIN CITY INNER			ACT CANBERRA CITY		
Age (years):	Males	Females	Persons	Males	Females	Persons
0-4 years	70	60	130	11	19	30
5-9 years	51	35	86	9	15	24
10-14 years	48	44	92	13	16	29
15-19 years	68	81	149	22	20	42
20-24 years	328	235	563	129	92	221
25-29 years	405	321	726	129	79	208
30-34 years	217	182	399	94	63	157
35-39 years	215	170	385	77	54	131
40-44 years	171	103	274	53	33	86
45-49 years	199	74	273	64	35	99
50-54 years	165	69	234	50	28	78
55-59 years	169	80	249	29	22	51
60-64 years	126	85	211	29	32	61
65-69 years	92	46	138	18	11	29
70-74 years	57	20	77	5	3	8
75-79 years	43	20	63	5	8	13
80-84 years	18	29	47	4	8	12
85 years and over	0	24	24	7	7	14
Total	**2442**	**1678**	**4120**	**748**	**545**	**1293**

Source: Population by Age and Sex, Regions of Australia, 2010 (cat.no 3235.0)

7 Answers

Please see the Answers attachment.

8 Glossary

Average annual growth rate:
The average annual growth rate is calculated as a percentage using the formula below, where P_0 is the population at the start of the period, P_n is the population at the end of the period and n is the length of the period between P_n and P_0 in years.

$$\left[\left(\frac{P_n}{P_0}\right)^{\frac{1}{n}} - 1\right] \times 100$$

Collection District(CD):
Is the second smallest area defined in the Australian Standard Geographic Classification. The CD is the smallest unit for collection and processing in the Census of Population and Housing.

Estimated Resident Population (ERP):
Is the count of all people regardless of citizenship and nationality, who usually live in Australia, with the exception of foreign diplomats and their families. It is the official measure of the Australian population.

Place of Enumeration:
Is the place at which a person is counted i.e. where he/she spent Census Night, which may not be where he/she lives.

Place of Usual Residence:
This is the place where a person usually lives.

Statistical Local Area (SLA):
Forms part of the Australian Standard Geographic Classification and is an area composed of one or more Collection Districts. SLAs are Local Government Areas or parts thereof.

9 References

(Note: Links to ABS publications are to the most recent release. Previous releases can be accessed by selecting the 'Past & Future Releases' tab.)

Australian Standard Geographic Classification (ASGC), (cat. no. 1216.0). http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1216.0Jul%202008?OpenDocument

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Census of Population and Housing, 2006, http://www.abs.gov.au/census

Population by Age and Sex, Regions of Australia, 2010 (cat.no. 3235.0)
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3235.0Main+Features12007?OpenDocument

Regional Population Growth (cat. no. 3218.0)
http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/797F86DBD192B8F8CA2568A9001393CD?OpenDocument

10 Feedback

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